

## **Clinical characteristics, complications, prognosis and outcome of endovascular repair and traditional open surgery in treating infectious abdominal aneurysm.**

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### **Abstract**

**Objective:** To make comparisons on similarities and differences of clinical effects of endovascular repair and traditional open surgery for patients with infectious abdominal aneurysm.

**Methods:** 20 cases with infectious abdominal aneurysm admitted in our hospital from January 2012 to January 2015 were selected, and patients were divided into two groups randomly. 10 cases received traditional open surgery, and 10 cases accepted endovascular repair surgery. After treatment, the operative time, intraoperative blood loss, complications after postoperative recovery and mortality of the two groups of patients were analyzed and compared.

**Results:** compared to the traditional open surgery, the operative time, intraoperative blood loss, wound length and length of stay for endovascular repair were lower. The data comparisons showed statistical significance ( $P<0.05$ ); among the cases accepting endovascular repair, only two cases (20%) suffered from severe complications, while 5 cases (50%) in open surgery group, showing statistical significance ( $P<0.05$ ); during follow-up visit, no death occurred in endovascular repair group, while two cases died in the traditional open surgery group.

**Conclusions:** The endovascular repair for infectious abdominal aneurysm is characterized by short operation time, less blood loss, small wound, rapid postoperative recovery, with exact clinical effect. Compared with the traditional open surgery, it can be used as a preferred treatment method in the clinical treatment.

**Discussion:** According to the surgical process, the endovascular repair is more strict; when performing the endovascular repair, it is necessary to determine appropriate type of stent, diameter of stent, and the flexibility of the stent. It is required to give full consideration to the influencing factors of operation and prognostic effect before and after surgical operations, to reduce the risks and enhance the life of quality of patients after surgery.

**Keywords:** Infectious abdominal aneurysm, Endovascular repair, Traditional open surgery, Clinical characteristics, Complications, Prognosis.

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### **Introduction**

Infectious abdominal aneurysm is a kind of rare malignant disease with high risk, mainly caused by endovascular infection induced by ruptured aortic aneurysm [1]. The domestic and international literature search [2,3] indicated that there were only few cases reported. For the infectious abdominal aneurysm, the traditional open surgery was mainly performed to resect the aneurysm. But when the infectious abdominal aneurysm is ruptured and onset is acute, traditional surgery will easily result in patient death. According to relevant literatures [4,5], the mortality rate of traditional open surgery is about 30%. So, it is very urgent to explore a safe method. The endovascular repair applies a stent in the blood vessel for vascular dilation treatment, with less wound, so, it is safer [6]. This paper introduced the endovascular repair in

treating infectious abdominal aneurysm and made comparisons with traditional open surgery, details were as follows:

### **Data and Methods**

#### **Basic data**

A total of 20 cases with infectious abdominal aneurysm admitted in our hospital from January 2012 to January 2015 were randomly divided into endovascular repair group and traditional open surgery group. 10 cases in endovascular repair group, including 6 males and 4 females, with median age of 54 y (44~62 y), and average age of  $(47.99 \pm 4.8)$  y; 10 cases in open surgery group, including 7 males and 3 females, with median age of 56 y (42~59 y), and average age of  $(48.5 \pm 4.6)$

y. Basic data for two groups of patients were as shown in Table 1.

**Table 1.** Statistical table of basic data for two groups of patients.

Groups	Number of Cases (n)	Sex (n)		Age	
		Number of Males	Number of Females	Age Range	Median Age
Endovascular repair group	10	6	4	44-62	54
Open surgery group	10	7	3	42-59	56
X <sup>2</sup> value		1.305		0.953	
P value		0.072		0.085	

### Screening criteria

**Inclusion criteria:** The patients meeting with following standards were included: 1) All patients have been diagnosed of abdominal aortic aneurysm, diagnosis standards: diameter of certain artery tubercle under renal artery is above 1.5 cm or diameter of certain artery tubercle on renal artery is above 0.75 cm [7]. 2) The blood specimens for all patients were infected with same bacteria in at least two times of culture results, namely infection was accurately diagnosed [8]. 3) No other infection for all patients one week prior to falling ill. 4) No statistical significance ( $P>0.05$ ) for age and sex of patients. 5) This study has obtained consent of patients themselves or their family members, who should sign the informed consent.

**Exclusion criteria:** Patients with abdominal aortic aneurysm rupture tendency, cardiovascular and cerebrovascular diseases, liver and kidney dysfunction, malignant tumors, surgical contraindications, systemic metabolic diseases, and patients with a history of hypertension, diabetes and other family genetic diseases with poor compliance.

### Methods

Since admission, basic treatment like vital signs monitoring, routine anti-infection, control of blood pressure and heart rate

**Table 2.** Clinical characteristic comparison between two groups of patients.

Groups	Number of Cases (n)	Operative Time (h)	Intraoperative Blood Loss (ml)	Wound Length (cm)	Length of Stay (d)
Endovascular repair group	10	2.4 ± 0.4	159 ± 15	1.4 ± 0.08	14 ± 4
Open surgery group	10	5.4 ± 0.2	274 ± 36	4.1 ± 0.5	26 ± 5
t value		5.326	4.607	3.636	4.044
P value		0.033	0.038	0.047	0.042

were performed, then either open surgery or endovascular repair was selected dependent on wills of patients and family members. 10 cases accepted endovascular repair, straight stents were embedded into 2 males and 3 females, and bifid stents were embedded into 4 males and 1 female. 10 cases accepted open surgery, including aortic aneurysm resection, lumen dilation for debridement, reconstruction of renal artery non-anatomic bypass. After operation, the antibiotics effective to infected bacteria were given to the patients by intravenous drip according to preoperative blood culture, till body temperature and hemogram were normal and wound was preliminary healed, then antibiotics were given by oral administration for at least 9 months. All patients were followed up one year after discharge.

### Evaluation indexes

The clinical characteristics, postoperative complications and fatality rate for two treatment methods were compared. The clinical characteristics include operative time, intraoperative blood loss, wound length and length of stay.

### Statistical method

For all data in this study, SPSS19.0 software was used for statistical analysis, the measurement data were inspected by t value, comparison among groups was tested by using chi-square  $\chi^2$ . inspection standard  $\alpha=0.05$ .  $P<0.05$  showed statistical significance.

### Results

#### Comparison of clinical characteristics between two groups of patients

Compared to the traditional open surgery group, the operative time, blood loss, wound length and length of stay for endovascular repair were lower, the data comparison between two groups showed statistical significance ( $P<0.05$ ). The detailed data were as shown in Table 2.

**Comparison of postoperative complications for two groups of patients**

Among the endovascular repair group, only 2 cases (20%) suffered from severe complications, while 5 cases (50%) suffered from severe complications in open surgery group, the

incidence in the open surgery group was significantly higher than the endovascular repair group. The endovascular repair group was superior to the open surgery group, with statistically significant difference between the two groups ( $P < 0.05$ ). Details were shown in Table 3.

**Table 3.** Postoperative complications comparison between two groups of patients.

Groups	Number of Cases (n)	Arrhythmia (n)	Arterial obstruction of lower extremities (n)	Serious infection of wound (n)	Total incidence (%)
Endovascular repair group	10	1	1	0	20
Open surgery group	10	2	1	2	50
X <sup>2</sup> value					5.392
P value					0.036

**Comparison of fatality rate for two groups of patients**

During the follow-up visit, no death occurred in endovascular repair group. Among the open surgery group, 1 patient died of multiorgan failure, 1 patient died of hemorrhage of digestive tract after 9-month follow-up visit, other patients survived well. Through comparison, the endovascular repair group was of better curative effects ( $P < 0.05$ ).

make comparison of the clinical characteristics and effects of traditional open surgery and endovascular repair in treating infectious abdominal aneurysm, this study is specially designed.

In this study, 20 cases with infectious abdominal aneurysm who were admitted in our hospital were divided into endovascular repair group and open surgery group, the endovascular repair was adopted for endovascular repair group, and aneurysm resection and dilating debridement therapy were adopted for the open surgery group. Relevant studies have indicated that the operative time, intraoperative blood loss, wound length and stay length was respectively  $2.4 \pm 0.4$ ,  $47 \pm 15$ ,  $1.4 \pm 0.08$  and  $14 \pm 4$ , lower than  $5.4 \pm 0.2$ ,  $274 \pm 36$ ,  $4.1 \pm 0.5$  and  $26 \pm 5$  in open surgery group. Through comparison, the endovascular repair is better, showing statistical significance ( $P < 0.05$ ); as to the postoperative complications, only 2 cases (20%) in endovascular repair suffered from serious complications, 1 suffered from arrhythmia and 1 from arterial obstruction of lower extremities. In the open surgery group, 5 cases (50%) suffered from serious complications, 2 suffered from arrhythmia, 1 from arterial obstruction of lower extremities and 2 from serious wound infection, showing the endovascular repair was better ( $P < 0.05$ ); in endovascular repair group, no death occurred during follow-up visit, in open surgery group, 1 case died of multiorgan failure, 1 patient died of hemorrhage of digestive tract, other patients survived well. Through comparison, the endovascular repair group was of better curative effects ( $P < 0.05$ ). In conclusion, compared to the traditional open surgery, the endovascular repair for infectious abdominal aneurysm is characterized by short operation time, less blood loss, small wound, rapid postoperative recovery, less complications and better prognosis, so, it is preferred in clinic.

**Discussion**

Abdominal Aortic Aneurysm (AAA), a kind of balloon dilating disease in abdominal aorta, belongs to aortic aneurysm, AAA takes up 75%, including suprarenal AAA and infrarenal AAA, the latter [9] was commonly seen. The infectious abdominal aneurysm, caused by bacteria infection of abdominal aorta, was first reported by British doctor Whillian Osler [10], it is characterized by easy rupture, difficult diagnosis and high fatality rate. Incidence of the infectious abdominal aneurysm is about 2.5% [11].

By long-term study on infectious abdominal aneurysm, the typical treatment methods have been summarized, mainly including: aneurysm resection, lumen dilation for debridement, taking antibiotics for a long time to resist growth of bacteria. The typical treatment method can resist bacteria growth by aneurysm resection and taking antibiotics, but the long-term epidemiology statistics have showed that the fatality rate for patients with infectious abdominal aneurysm is about 30% [12,13]. The endovascular treatment, as a kind of newly emerged method for treating endovascular diseases, has been widely used in clinic in treating endovascular diseases due to minimally invasive, simple operation, low nocuity and high curative effects. For the endovascular repair, it performs angiography at aneurysm location before operation, to measure the length and diameter of blood vessel to be repaired, then an appropriate stent is selected for support and repair. In China, Minyan et al. believe that the main advantages for endovascular repair in treating infectious abdominal aneurysm are small wound, short length of stay, less blood loss and transfusion, better curative effects and low fatality rate. To

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